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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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07/29/2003

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EXAMINER

GEBREMARIAM, SAMUEL A

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 03/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/629,014

Applicant(s)

COHEN ET AL.

Examiner

Samuel A. Gebremariam

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 24-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 30 and 36 is/are allowed.
- 6) ☒ Claim(s) 24-29, 30-35 and 37-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 26 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitation of "said spacers have structural indicia indicating that said spacers comprise a deposited insulator" as recited in claim 26 has no support in the specification as originally filed.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 24-29, 31-35, and 37-38 are rejected under 35 U.S.C. 102(b) as anticipated by Lee et al. (Super Self-aligned Double-Gate (SSDG) MOSFETS Utilizing Oxidation Rate Difference and Selective Epitaxy, IEEE, 1999, pp71-74).

Regarding claim 24, Lee teaches (fig. 1) an integrated circuit comprising: a channel region fig. 1c, page 71 1st paragraph); a top gate (TG) above the channel

Art Unit: 2811

region; bottom gate (BG) below the channel region; and spacers (fig. 1e) adjacent the top gate and the bottom gate, wherein the spacers comprise a material that is independent of the material of the top gate and the bottom gate (the gate material of both the top and bottom gates is doped polysilicon while the spacer is silicon oxide. Therefore the spacer material is independent of the top gate material).

Regarding claim 25, Lee teaches the entire claimed structure of claim 1 above including the top gate and the bottom gate comprise the same material (fig. 1c and fabrication steps).

Regarding claim 26, Lee teaches the entire claimed structure of claim 24 above including the top gate and the bottom gate comprise an insulator.

The limitation that spacer is deposited is not given patentable weight, because it is considered to be a product-by-process claim. "[E]ven though product-by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Regarding claim 27, Lee teaches the entire claimed structure of claim 24 above including source and drain regions adjacent the top gate and the bottom gate, wherein the spacers separate the source and drain regions from the top gate and the bottom gate (fig. 1e and 1f).

Art Unit: 2811

Regarding claim 28, Lee teaches the entire claimed structure of claim 24 above including the spacers comprise upper spacers and lower spacers separated by the channel (fig. 1e).

Regarding claim 29, Lee teaches the entire claimed structure of claim 24 above including the spacers comprise lower spacers in direct contact with the top gate, wherein the spacers comprise lower spacers in direct contact with a lower section of the top gate and upper spacers in direct contact with an upper section of the top gate and the lower spacers are different than the upper spacers (see fig. 1e, the shapes are different and Lee's top gate is considered to have lower spacers that are in direct contact with the lower section of the top gate and upper spacers that are in direct contact with the upper section of the top gate).

Regarding claim 31, Lee teaches the entire claimed structure of claim 29 above including source and drain regions adjacent the top gate wherein the lower spacers are adjacent the source and drain regions and the upper spacers are at a level above the source and drain regions (fig. 1e).

Regarding claim 32, Lee teaches the entire claimed structure of claim 29 above including the upper spacers and the lower spacers are above the channel region.

Regarding claim 33, Lee teaches the entire claimed structure of claim 29 above including third spacers adjacent the bottom gate.

Regarding claim 34, Lee teaches the entire claimed structure of claim 29 above including source and drain regions adjacent the lower section of the top gate.

Art Unit: 2811

Regarding claim 35, Lee teaches the entire claimed structure of claims 29 and 32-34 above including silicide regions along upper portions of the source and drain regions, wherein the silicide regions are adjacent a point where the upper spacers meet the lower spacers and the lower spacers are different than the upper spacers (see fig. 1e, the shapes are different).

Regarding claims 37 and 38, Lee teaches the entire claimed structure of claims 33 and 35 above including the upper spacers and the lower spacers are above the channel region (fig. 1e).

Allowance

5. Claims 30 and 36 are allowed.

Response to Arguments

6. Applicant's arguments filed 12/21/04 have been fully considered but they are not persuasive. Applicant argues that independent claim 24 defines that the materials are independent of one another, which requires a showing of more than two different variants of the same material. As stated in the previous office action the limitation of "independent of the material of said top gate and said bottom gate" is broadly interpreted to mean that the gate material and the spacer materials independent in the sense that gate material conductive and the spacer material is an insulator. Therefore spacers adjacent the top gate and bottom gate are independent materials.

Applicant's argument that the inventive process uses sacrificial nitride layers and replaces the sacrificial layer with upper and lower gates the material selection for the spacers is completely independent of the material selection of the upper and lower

Art Unit: 2811

gates is considered a product-by-process claim. "[E]ven though product-by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Furthermore applicant argues that since the inventive process of forming the spacers 307 and 1200, results in distinct upper and lower spacers adjacent the top gate. Since the claim only states spacers comprising lower spacers in direct contact with a lower section of the top gate and upper spacers in direct contact with an upper section of the top gate, Lee's fig. 1e can be interpreted as having top gate that is considered to have lower spacers that are in direct contact with the lower section of the top gate and upper spacers that are in direct contact with the upper section of the top gate.

Conclusion

7. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

Art Unit: 2811

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A. Gebremariam whose telephone number is (571)-272-1653. The examiner can normally be reached on 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAG
February 24, 2005



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